



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200

D412-664-403
Job Sheet 171066



Part No: D412-664-403

Job Qty: 1 ea

Part Name: 412 Stainless Steel Aft Crosstubes - High



Part Weight: 0 lbs

Status: Scheduled

Priority: Medium

Job Created: 1/26/18

Job Tracking No:

Due Date: 1/31/18

Created By: Marie Lajeunesse

Type: Stock

Description:

Note: D412-664-443 REV.B/ IIN-D212-664 REV.I IPP REV:A 13.10.25 NEW ISSUE DD VERF:JLM IPP Rev.B
17.06.26 As per Dwg/Chg/PAR16-545 DP Verify DD

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Sign-off
					Setup hrs	Run Hrs	Workcenter / Supplier	Lead Time	
90	Start up Operation	1 Ea		1/30/18	0.00	0.00	Start Up Crosstubes-2		GP
110	CNC Bend Crosstubes	1 pcs		1/30/18	0.00	5.88	CNC Bend Crosstube		DAS GP/PDZ
127	QC	1 pcs		1/30/18	0.00	0.00	QC15		38
128	Crosstubes	1 pcs		1/30/18	0.00	2.78	Crosstubes-2		9-89 DP2/GP
130	Crosstubes	1 pcs		1/30/18	0.00	2.78	Crosstubes-2		DP2
140	QC	1 pcs		1/30/18	0.00	0.00	QC6		38
174	Outsource	1 pcs		1/30/18	0.00	0.00	Outsource2		1-89 FEB 15 2018
176	Packaging	1 pcs		1/30/18	0.00	0.00	Packaging2		1-89 FEB 15 2018
178	QC	1 pcs		1/30/18	0.00	0.00	QC5		38
180	SprayPaint	1 pcs		1/30/18	0.00	2.70	Spray Paint		DP2 18-02-18
190	QC	1 pcs		1/30/18	0.00	0.00	QC14		38
200	Crosstubes	1 pcs		1/31/18	0.00	2.78	Crosstubes-2		AB FEB 24 2018
210	QC	1 pcs		1/31/18	0.00	0.00	QC5		38
220	Packaging	1 pcs		1/31/18	0.00	0.00	Packaging1-4		OFF FEB 28 2018
230	QC	1 pcs		1/31/18	0.00	0.00	QC4		SMB
235	DC	1 pcs		1/31/18	0.00	0.00	DC		
240	Packaging	1 pcs		1/31/18	0.00	0.00	Packaging3-2		SMB FEB 28 2018
250	QC21-FG	1 Ea		1/31/18	0.00	0.00	QC21		21 MAR 02 2018

Part Op 110 - Bend tube as per Dwg D412-664-443 using CNC bender program D412-664-443 *****USE (4) DT9824 SHIM BLOC
Descriptions: TO CHECK STRAIGHTNESS*****

127 - ***MARK CUT LINES***

128 - CUT TUBE AT HEIGHT ON FAI SHEET VERF HEIGHT 24.375 BY QC 15 LEVEL INSPECTOR TW

VERF TWIST 0.179 BY QC15 LEVEL INSPECTOR TW
130 - 1- Drill Tube as per Dwg D412-664-443 Using DT8550/8551 Drill Jigs, Set-up drill table as per QSI 010 2-Deburr 3-Engrave Part # and Batch # as per Dwg D412-664-443 4-Remove all marks from tube within limits of D412-664-443 DWG.

174 - ISSUE P/O TO ACCUREN: 039037

180 - ***USE AXALTA 230S PRE-TREATMENT AS PER QSI005*** AXALTA BATCH: 138021 *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** **VERIFY BY AB BATCH # TO MATCH W/O

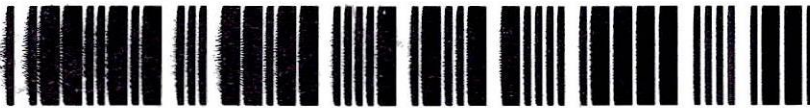
VERIFY BY AB PART # TO MATCH W/O 138687 ***MASK SCRIBE B# & P# AND VERIFY 1-Prime inside & outside cross tube as per QSI 005 4.2 BATCH: 138687 2- Apply matte clear coat to underside of cross tube per QSI005 4.2 BATCH: P.O:38689 3- MASK UNDERSIDE OF CROSSTUBE AS SHONE ON DWG BEFORE PAINTING 4 -Paint Outside of Tube as per Dart QSI 005 4.2 BATCH: 138741 5-Remove masking

200 - 1- *****LAY DOWN CORSTUBE ON TABLE AND PUT DT10302 PINS IN SADDLE HOLE FACING UP, USE

D412-664-403/171066/5039673

DART
AEROSPACE
S039673

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Hawkesbury, ON K64 1K7
CANADA
TEL.: 1 613 632-5200
Email: sales@artaero.com
www.artaerospace.com



412 Stainless Steel Aft Crosstubes – High

PART NO: D412 – 664 – 403

Original Serial #: S039673

Revision:

Operation: Start up Operation 02/06/18

Change No: CHG002

Job No: 171066

HOLE IN TAPE MEASURE TO PUT IN PINS FOR LOCATING CENTER OF CROSSTUBE. ***** Install center support using scotch-weld DP460 per QSI 015, as per DWG. note 12. Install supports clamps as per Dwg D412-644-443. .
 ENSURE CLAMPS ARE ON TOP OF CROSSTUBE SUPPORT Torque clamps on support to 80-100 IN-LBS AS PER DWG. A/R scotch-weld DP460 BATCH #: 137679 EXP DATE: 6/18 2- **IF NOT ALREADY PRESENT ON CHAFFING SHEILD. ** Apply a thin coat of proseal 890 per QSI 015 on inside concave surface of chafing shield and let cure per manufacturer's instructions. Install prosealed chafing shield onto crosstube by applying a thin coat of proseal 890 onto crosstube. Be sure to eliminate any air gaps. Install and torque clamps on chafing shield to 40-50 IN-LBS AS PER DWG. A/R Proseal 890 Batch: 138708 EXP DATE: 5/18 AFTER FINISH CURE TIME 24H START CURE TIME: 18-2-24 FINISH CURE TIME: 18-2-25 PRIOR TO PACKAGING RE-CHECK TORQUE ON CLAMPS AFTER CURED FOR 24H.

210 - PRIOR TO PACKAGING RE-CHECK TORQUE ON CLAMPS AFTER CURED FOR 24H.

235 - Photocopy bluefile & type labels per PPPD412-664-403 CHG002

240 - Identify and pack for shipping as per PPPD412-664-443 Location: _____ PPP Rev: _____

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
D412-664-443TRN	Crosstube Turning Detail	1 Ea (1 ea)	90-Start up Operation	
D4910-1	Chaffing Shield	2 Ea (2 ea)	200-Crosstubes	
MS21920-26	Clamp	4 Ea (4 ea)	200-Crosstubes	
D5380-1	Support	1 Ea (1 ea)	200-Crosstubes	
D5380-3	Support Base	1 Ea (1 ea)	200-Crosstubes	
NAS1805-4P	Nut	8 pcs (8 ea)	200-Crosstubes	
NAS6704-21	Bolt	8 pcs (8 ea)	200-Crosstubes	
AN6-40A	3/8-24 Bolt X 3" Long	4 Ea (4 ea)	220-Packaging	
AN6-41A	Bolt	2 Ea (2 ea)	220-Packaging	
MS21042L6	Nut	6 Ea (6 ea)	220-Packaging	
NAS1149D0663J	Washer	18 Ea (18 ea)	220-Packaging	

Job Allocations

Operation	Component Part	Required	Inventory	Allocated
90-Start up Operation 200-Crosstubes	D412-664-443TRN	1	5	0
	D4910-1 <u>5020096</u>	②	6	0
	D5380-1 <u>163595</u>	1	10	0
	D5380-3 <u>163596</u>	1	10	0
	MS21920-26 <u>FM136740-0</u>	4	30	0
	NAS1805-4P <u>FM138003.90</u> ⑦	8	23	0
	NAS6704-21 <u>M128003</u>	⑧	24	0
220-Packaging	AN6-40A - <u>FM138209-3</u>	4	112	0
	AN6-41A - <u>FM137371-0</u>	2	46	0
	• MS21042L6 <u>5016881</u>	6	496	0
	• NAS1149D0663J <u>5024481</u>	18	1,250	0

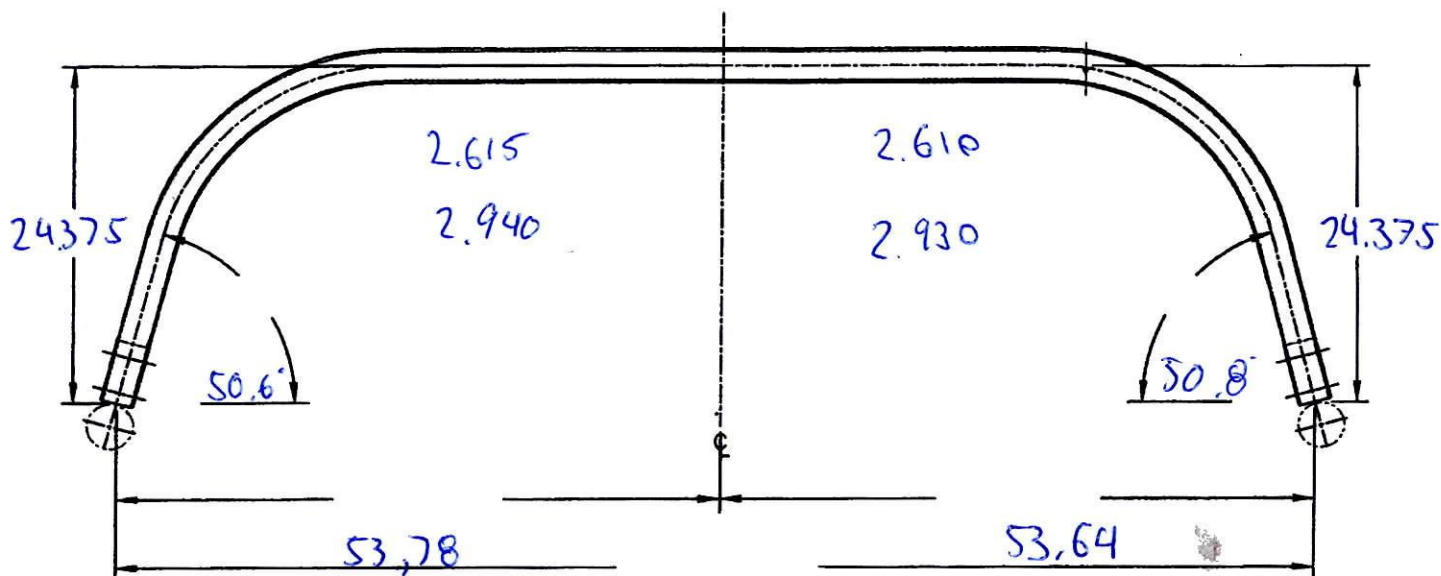
Part Specifications

Specifications could not be found.

Plex 1/26/18 12:51 PM Dart.lajeunesse.marie

DART AEROSPACE LTD		Work Order:	171080
Description: Crosstube High Aft (412)		Part Number:	D412-664-403
Inspection Dwg: D412-664-443	Rev: A B 18.01.20	Page 1 of 1	

Required Dimension	Min	Max
Height	24.12	24.62
1/2 Span	53.56	53.82
Angle	49°	52°
Total Span	107.12	107.64
Bending Passes	8	--
Crushing	--	7%



	Side A	Side B
Bending Passes	6	5
Crushing	5.9%	5.8%
Comments		

QC15 Inspection	38
Date	9-88
	FEB 07 2018

Rev	Date	Change	Revised by	Approved
A	14.07.08	New Issue	KJ	UP

Item	Qty	Part Number	Description
	443		
1	X	D412-664-443	CROSSTUBE ASSEMBLY (412 HI AFT)
2	1	D6020-132	CROSSTUBE MATERIAL
3	2	D4910-1	CHAFING SHIELD
4	1	D5380-1	SUPPORT
5	1	D5380-3	SUPPORT BASE
6	4	MS21920-26	CLAMP
7	8	NAS1805-4P	NUT
8	8	NAS6704-21	BOLT
9	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD
10	A/R	PROSEAL 890 OR 1422	SEALANT

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6020-132
FINISHED LENGTH = 130.10±0.060 (BEFORE BENDING/TRIMMING)
- 2) FINISH: PREPARE TUBE PER QSI 005 SECTION 4.1.4
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
APPLY MATTE CLEAR COAT TO UNDERSIDE OF CROSSTUBE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C8-2, HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2
AFTER PAINTING, REMOVE MASKING
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART P/N "D412-664-443" AND B/N ON INSIDE OF CUFF PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 87.8 lb FINISHED WEIGHT
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

BENDING

- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7% (BASED ON O.D.) IN LOWER HALF OF R35 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 036. TO BE PERFORMED AFTER FINAL POST-BEND GRINDING. ANY ADDITIONAL GRINDING REQUIRES ANOTHER LPI INSPECTION.

ASSEMBLY

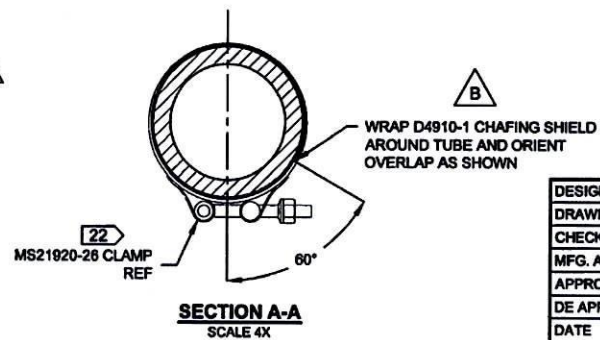
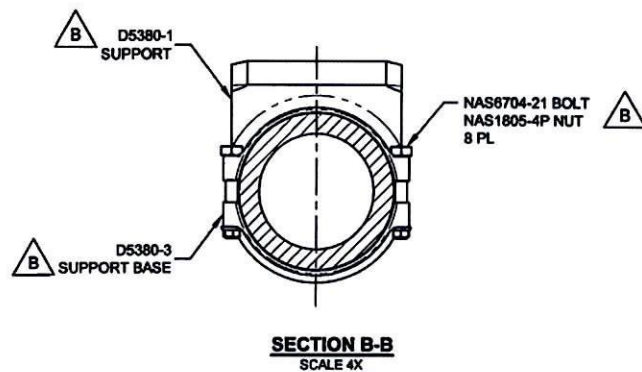
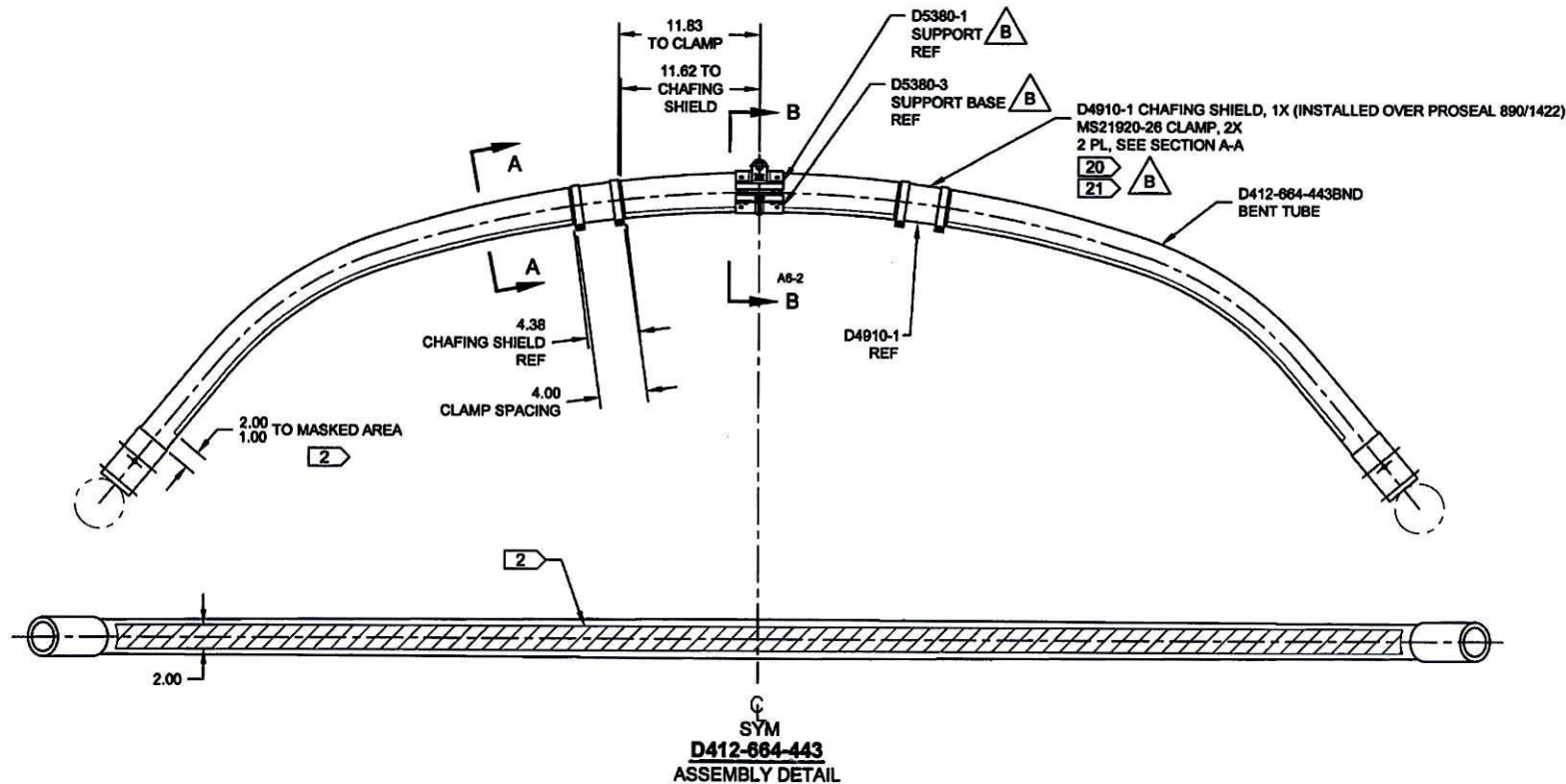
- 12) LOCATE THE D5380-1/3 SUPPORTS ONTO THE CROSSTUBE AS SHOWN IN THE ASSEMBLY DETAIL.
- 13) ABRASE THE MATING SURFACES OF THE CROSSTUBE AND D5380-1/3 SUPPORT HALVES WITH 180-GRIT SANDPAPER. SATURATE A CLEAN CLOTH WITH MEK, 4105S WASH'N'WIPE DEGREASER OR EQUIVALENT AND WIPE CLEAN UNTIL THERE IS NO RESIDUE.
- 14) APPLY A 0.04" TO 0.07" THICK LAYER OF 3M DP460 ADHESIVE ONTO THE CONCAVE SURFACE OF THE D5380-1 SUPPORT AND THE D5380-3 SUPPORT BASE.
- 15) INSTALL D5380-1 SUPPORT ONTO THE CROSSTUBE AS SHOWN IN THE ASSEMBLY DETAIL AND INSTALL QTY (2) NAS6704-21 BOLTS INTO OPPOSING CORNERS OF THE D5380-1 SUPPORT. ALIGN THE BOLTS WITH THE HOLES ON D5380-3 SUPPORT BASE AND INSTALL ONTO THE CROSSTUBE.
- 16) INSTALL THE REMAINING QTY (8) NAS6704-21 BOLTS AND QTY (8) NAS1805-4P NUTS, THEN EVENLY TORQUE THE NUTS IN A CRISS-CROSS PATTERN TO 80-70 IN-LBS. ENSURE A MINIMUM OF 1.5 THREADS ARE IN SAFETY.
- 17) WIPE OFF EXCESS ADHESIVE USING A CLEAN CLOTH SATURATED WITH MEK, 4105S WASH'N'WIPE DEGREASER OR EQUIVALENT
- 18) ALLOW DP460 ADHESIVE TO CURE FOR 24 HOURS.
- 19) FILLET SEAL THE EDGES OF THE D5380-1/3 SUPPORT HALVES WITH PROSEAL PR1422 B1/2 OR PR890 B1/2 ALLOW PROSEAL TO CURE FOR 24 HOURS.
- 20) IF NOT ALREADY PRESENT ON D4910-1 CHAFING SHIELD, APPLY A 0.015" TO 0.020" THICK COAT OF PROSEAL 890/1422 ON INSIDE CONCAVE SURFACE OF D4910-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS.
- 21) RECOAT THE D4910-1 CHAFING SHIELD WITH 0.015"-0.020" OF PROSEAL 890/1422 AND IMMEDIATELY INSTALL ONTO THE CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS. ENSURE THE D4910-1 CHAFING SHIELDS ARE WRAPPED TIGHTLY.
- 22) TORQUE CLAMPS ON D4910-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON MS21920-26 CLAMPS AFTER ADHESIVES HAVE CURED FOR 24 HOURS.

SHOP COPY
RETURN TO
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SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 17146 BND
1801-26

RELEASED

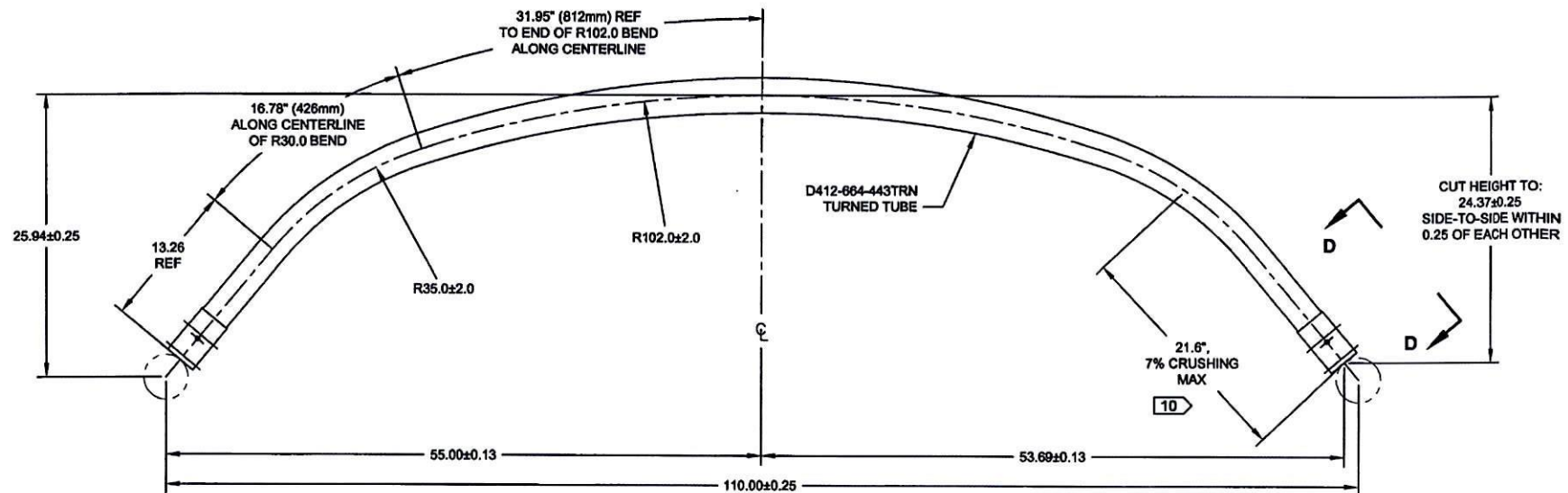
2017 JUN 21
ECN17-593

B	ADD ITEMS 4, 5, 7, AND 8. DELETED ITEMS D4909-1, MS21920-26 & D3595-063-530. NOTE 2 UPDATED FOR TUBE FINISH. ALL ASSEMBLY NOTES REWRITTEN. SHEET 2 SECTION A-A ANGLE DIM ADDED FOR CHAFING SHIELD INSTALLATION. ASSEMBLY DETAIL AND SECTION B-B UPDATED FOR INSTALLATION OF D5380-1/3.	AJS	16.11.03
A	NEW ISSUE	CP	14.04.01
REV.	DESCRIPTION	BY	DATE
DESIGN	CP	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	AJS	DRAWING NO.	REV. B
CHECKED	M. J. J.	D412-664-443	SHEET 1 OF 4
MFG. APPR.	J. J.	TITLE	SCALE
APPROVED	J. J.	CROSSTUBE ASSY (412 HI AFT)	NTS
DE APPR.	J. J.	DATE 16.11.03	
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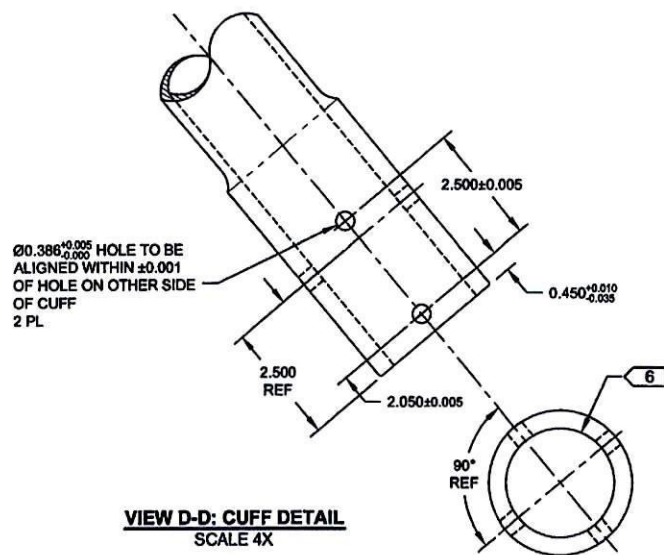


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2017 JUN 21 *up*

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CHECKED	<i>[Signature]</i>	DRAWING NO.	REV. B
MFG. APPR.	<i>[Signature]</i>	D412-664-443	SHEET 2 OF 4
APPROVED	<i>[Signature]</i>	TITLE	SCALE
DE APPR.	<i>[Signature]</i>	CROSSTUBE ASSY (412 HI AFT)	NTS
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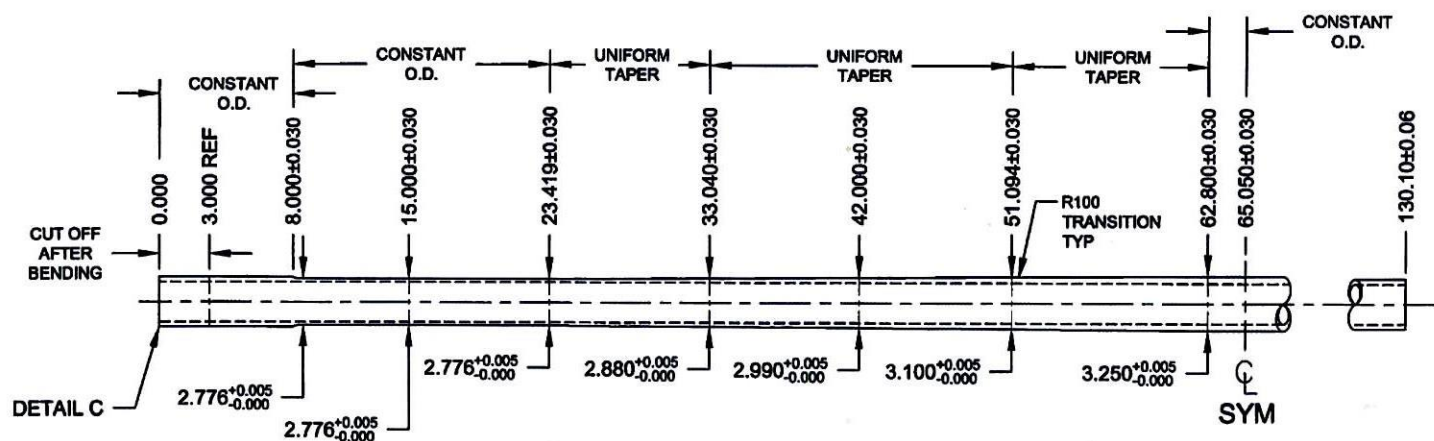
D412-664-443BND
BENDING DETAIL



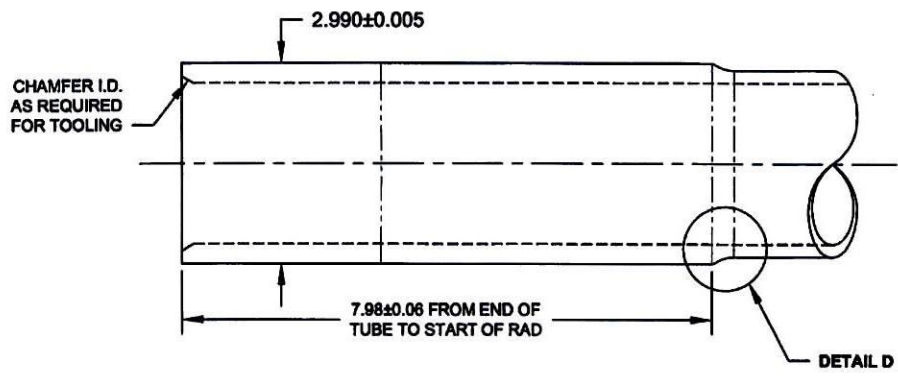
VIEW D-D: CUFF DETAIL
SCALE 4X

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2017 JUN 21

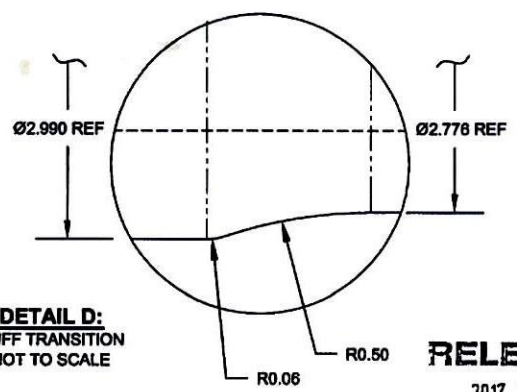
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MFG. APPR.	<i>[Signature]</i>	SHEET 3 OF 4	
APPROVED	<i>[Signature]</i>	TITLE	SCALE
DE APPR.	<i>[Signature]</i>	CROSSTUBE ASSY (412 HI AFT)	NTS
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D412-664-443TRN
TURNING DETAIL



DETAIL C:
CUFF TRANSITION
SCALE 4X



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2017 JUN 21

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MFG. APPR.	<i>[Signature]</i>	D412-664-443	SHEET 4 OF 4
APPROVED	<i>[Signature]</i>	TITLE	SCALE
DE APPR.	<i>[Signature]</i>	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
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**skyservice****Work Order Traveler**

Sky Service F.B.O. Inc.

10105 Ryan Avenue, Dorval, Quebec, H9P 1A2

TCCA AMO 53-89 / EASA 145.7142 / BDA AMO 385

WO #: MWO34975	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: PO039037
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN:	CSN:	TSO:	
Task: UNSCHEDULED			Sequence: 1

Work Required:

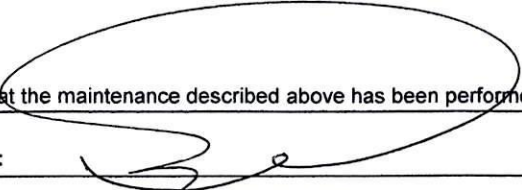
CARRY OUT NDT ON:

1 FUEL TANK ASSY P/N# D4464-041 , J/S# 170434

5 AFT CROSSTUBES , P/N# D412-664-403 , J/S# 171064, 171065, 171066, 171067, 171068

Action Taken:						Date:	Initial/Stamp:
LPI C/O IAW ASTM E-1417M-13 NO CRACK FOUND PEN. ZL-56, MPO13600, CLEANER SKC-S MPO13923 , DEV. MPO11715 , UV LIGHT M-20142						FEB 14 2018	 
<i>Description</i>	<i>Location</i>	<i>P/N</i>	<i>Qty</i>	<i>Batch</i>	<i>S/N Off</i>	<i>S/N On</i>	
			DAS 38 9-89				

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature: 	ACA/SCA Stamp 	Date: FEB 14 2018
Name: RAFIK MELIKIAN		



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200

PURCHASE ORDER PO039037

Supplier: SKY002-VC
Skyservice
6120 Midfield Road
Mississauga
ON
L5P 1B1 Canada
Phone: 905-678-5636
Fax: 905-678-5841

PO No: PO039037
PO Date: 2/14/18
Due Date:
**Purchase Order
Revision:**
Revision Date:
Ship-To Contact: Phone:

Ship To: 1270 Aberdeen Street
Hawkesbury
ON
K6A 1K7 Canada
Phone: 613-632-5200

Via: Ground
Pymt Terms: Net 30
Freight Terms:
Special Comments:

Items

Line Item	Job	Part	Description	Status	Due Date	Order Quantity	Received Quantity	Balance	Unit Price (CAD)	Extended Price
1	170434	D4464-041	Fuel Tank Assembly ISSUE P/O : LIQUID PENETRANT INSPECTION AS PER QSI 038 OR LPI AS PER ASTM 1417 LEVEL 2	Firmed		1 pcs	0 pcs	1 pcs	\$198.3333/pcs	\$198.33
2	171068	D412-664-403	412 Stainless Steel Aft Crosstubes - High ISSUE P/O TO ACCUREN:	Firmed		1 pcs	0 pcs	1 pcs	\$198.3333/pcs	\$198.33
	171067			Firmed		1 pcs	0 pcs	1 pcs	\$198.3333/pcs	\$198.33
	171066			Firmed		1 pcs	0 pcs	1 pcs	\$198.3333/pcs	\$198.33
	171065			Firmed		1 pcs	0 pcs	1 pcs	\$198.3333/pcs	\$198.33
	171064			Firmed		1 pcs	0 pcs	1 pcs	\$198.3333/pcs	\$198.33
Sub Total:						5	0	5		\$991.67

Grand Total: \$1,190.00

Order Notes

Procurement Quality Clauses
A005 right of entry
A012 chemical and physical test report
A016 personnel qualification
A017 raw material identification (as applicable)

A022 Apical Processing
A024 process certifications
A026 certification of material conformance

A041 quality management system
A042 dart notification by supplier
A043 retention of quality documents

A048 counterfeit parts avoidance, detection, mitigation and disposition program

A049 supplier awareness

11

Part Number: D412-664-403

Description: CROSSTUBE INSTALLATION, HEAVY DUTY, HIGH AFT

[illegible]

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval		
Description Work Order Deviation				Disposition					
Root Cause		FAULT CATEGORY							
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐				
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐				
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐				
Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐				
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐				
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐				
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐				
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐				
LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐				
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐				
Past Expiry Date ☐	Manufacturing Process ☐	OTHER :							
Misidentified ☐	Past Due ☐								